Principal Effects:

Using hierarchical linear growth models to investigate the effects of principal preparation and professional experience on teacher hiring and student proficiency

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Context

- New policies locally and nationally place principals at the center of school reform efforts
  - US: Race to the Top, SIG
  - IL: New principal certification & evaluation systems

- Series of IERC studies on public school principals in Illinois funded by the Joyce Foundation:
  - Distribution of principal characteristics
  - Principal turnover
  - Survey on principal practices and preferences
  - Principal effects
  - Synthesis report

Principal Effects

- **Second largest school factor after teacher effects** *(Leithwood, Seashore-Louis, Anderson, & Wahlstrom, 2004)*
  - **Cumulative effect size for principals between 0.17 and 0.25** *(Branch, Hanushek, & Rivkin, 2009; Waters, Marzano, & McNulty, 2003)*
- **Substantial variation between principals in effectiveness** *(Rice, 2010)*
  - **As with teacher effects, the amount of variation that can be explained by observable principal characteristics is relatively small** *(Branch, Hanushek, & Rivkin, 2009; Clotfelter, Ladd, Vigdor, & Wheeler, 2007; Clark, Martorell, & Rockoff , 2009)*
  - **Some characteristics may differentiate principals who are more effective from those who are less so:**
    - **Principal education, training, and PD: no consistent, statistically significant impact on student achievement gains** *(Wheeler, 2006; Clark, et al., 2009; Clotfelter et al., 2007)*
    - **Prior experience as principal** *(Clark, et al., 2009)* **– especially at current school** *(Wheeler, 2006; Branch et al., 2009)* **– seems to matter most**
      - **For new principals, school tenure as assistant principal also seems to matter** *(Clark et al., 2009)*

Research Question #1

To what extent do principals' preparation and professional experience influence school proficiency growth in Illinois?

Methodology

We estimate two-level hierarchical linear growth models …	• Level 1: within school change in over time • Level 2: differences between schools in initial status
…to measure the impact of principal training and experience on change in student proficiency over time	• DV: % proficient or advanced on ISAT/PSAE
All variables aggregated to the school-level	• Principal: race, undergrad selectivity, grad Carnegie class, IL work experience • Teacher and student controls (% inexperienced teachers, teacher academic qualifications, and student enrollment, attendance, mobility, race and poverty)
Models are estimated for all Illinois public schools over six academic years (2001-06), with separate models by:	• School level (elementary/middle vs. high school) • Locale (Chicago vs. non-Chicago)

Predicted Statewide 6-Year Student Proficiency 2000-2001 through 2005-2006: A Two-Level Hierarchical Linear Growth Model Controlling for Student Demographics

		Elementary/Middle School		High School	
		Non-CPS	CPS	Non-CPS	CPS
Differences in Initial Proficiency					
Teacher	% Inexperienced Teachers	**-.015**	.013	-.021	-.079
Teacher	ITAC	**.049**	.033	**.088**	**.190**
Principal	More Competitive Undergrad (vs. competitive)	.004	.012	.009	-.002
Principal	Less Competitive Undergrad (vs. competitive)	.007	.019	-.002	-.043
Principal	Grad Degree from Research Institution (vs. masters-level institution)	.005	.007	**.026**	.003
Principal	Minority (vs. white)	**-.060**	-.022	**-.099**	-.024
Principal	First Year at School (vs. 2-5 years at school)	-.001	-.001	.001	-.025
Principal	6+ Years at School (vs. 2-5 years at school)	**.016**	**.021**	.010	-.050
Principal	AP Years at School	.001	-.010	.008	.071
Differences in Proficiency Growth Rates					
Teacher	% Inexperienced	-.001	**.025**	.009	-.009
Teacher	ITAC	-.004	.003	.007	-.011
Principal	Minority (vs. white)	-.007	.001	.000	.008
Principal	First Year at School (vs. 2-5 years at school)	**-.011**	-.007	.012	-.006
Principal	6+ Years at School (vs. 2-5 years at school)	**-.021**	-.011	-.004	.035
Principal	More Competitive Undergrad (vs. competitive)	.000	.010	.001	.023
Principal	Less Competitive Undergrad (vs. competitive)	.001	-.006	-.006	-.003
Principal	Grad Degree from Research Institution (vs. masters-level institution)	-.002	-.010	-.008	.013
Principal	AP Years at School	**.006**	**.037**	.012	-.052
Principal	More Competitive Undergrad * First Year at School	**.007**	-.011	.002	.032
Principal	Less Competitive Undergrad * First Year at School	-.004	-.008	.010	.020
Model Statistics					
Intraclass Correlation		.85	.88	.81	.92
Residual Variance (improvement over unconditional model)		.09 (3%)	.05 (63%)	.10 (-4%)	.01 (90%)
Intercept Variance (improvement over unconditional model)		.14 (75%)	.14 (84%)	.09 (78%)	.26 (83%)

Significant at the .001 level Significant at the .01 level Significant at the .05 level

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		Elementary/Middle School		High School	
		Non-CPS	CPS	Non-CPS	CPS
Differences in Initial Proficiency					
Teacher	% Inexperienced Teachers	-.015	.013	-.021	-.079
Teacher	ITAC	.049	.033	.088	.190
	More Competitive Undergrad (vs. competitive)	.004	.012	.009	-.002
	Less Competitive Undergrad (vs. competitive)	.007	.019	-.002	-.043
Differences in Proficiency Growth Rates					
Principal	Minority (vs. white)	-.007	.001	.000	.008
Principal	First Year at School (vs. 2-5 years at school)	-.011	-.007	.012	-.006
Principal	6+ Years at School (vs. 2-5 years at school)	-.021	-.011	-.004	.035
Principal	More Competitive Undergrad (vs. competitive)	.000	.010	.001	.023
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"Indirect" Principal Effects

- **Principals affect student achievement through their influence on a school's curriculum, culture, and teachers** *(Hallinger & Heck, 1998; Leithwood & Riehl, 2003)*

- **A principal's ability to assess teacher quality is particularly important for improving student achievement.** More effective principals can:
  - **Attract teachers with stronger academics, more teaching experience, and better track records** *(Clotfelter et al., 2007)*
  - **Retain higher-quality teachers, remove less-effective teachers, and develop teachers' skills more rapidly** (*Beteille, Kalogrides, & Loeb, 2010)*

Research Question #2

To what extent do principals preparation and professional experience influence teacher qualifications?

Methodology

- **Same as with RQ#1, but DV = ITAC in *subsequent* year**
- **What is ITAC? Our "Index of Teacher Academic Capital" – a school-level composite of teacher academic qualifications** *(DeAnglis, Presley, and White, 2005)*:
  - **Teacher ACT Composite and English scores**
  - **Teacher undergrad selectivity (Barron's)**
  - **% of teachers with emergency/provisional certification**
  - **% of teachers failing the Illinois basic skills test on first attempt**

Predicted Statewide 5-Year ITAC 2000-2001 through 2004-2005: A Two-Level Hierarchical Linear Growth Model Controlling for Student Demographics

		Elementary/Middle School		High School	
		Non-CPS	CPS	Non-CPS	CPS
Differences in Initial Proficiency					
Principal	More Competitive Undergrad (vs. competitive)	.010	-.000	.030	.007
	Less Competitive Undergrad (vs. competitive)	-.004	.013	-.015	.016
	Grad Degree from Research Institution (vs. masters-level institution)	**.024**	.033	.023	.045
	Minority (vs. white)	**-.074**	-.076	-.008	-.019
	First Year at School (vs. 2-5 years at school)	.003	-.007	-.006	-.002
	6+ Years at School (vs. 2-5 years at school)	.002	-.011	-.019	-.001
	AP Years at School	-.008	-.016	.006	.018
Differences in Proficiency Growth Rates					
Principal	Minority (vs. white)	-.001	-.007	.021	-.004
	First Year at School (vs. 2-5 years at school)	.007	.020	.003	.045
	6+ Years at School (vs. 2-5 years at school)	.009	-.005	-.002	-.049
	More Competitive Undergrad (vs. competitive)	**.019**	.036	.009	.005
	Less Competitive Undergrad (vs. competitive)	.003	.004	-.007	.015
	Grad Degree from Research Institution (vs. masters-level institution)	-.008	-.006	-.008	.029
	AP Years at School	.002	.028	.019	-.146
Model Statistics					
Intraclass Correlation		.43	.64	.55	.70
Residual Variance (improvement over unconditional model)		.08 (60%)	.07 (85%)	.04 (87%)	.15 (77%)
Intercept Variance (improvement over unconditional model)		.44 (23%)	.52 (37%)	.42 (32%)	.59 (59%)

Significant at the .001 level Significant at the .01 level Significant at the .05 level

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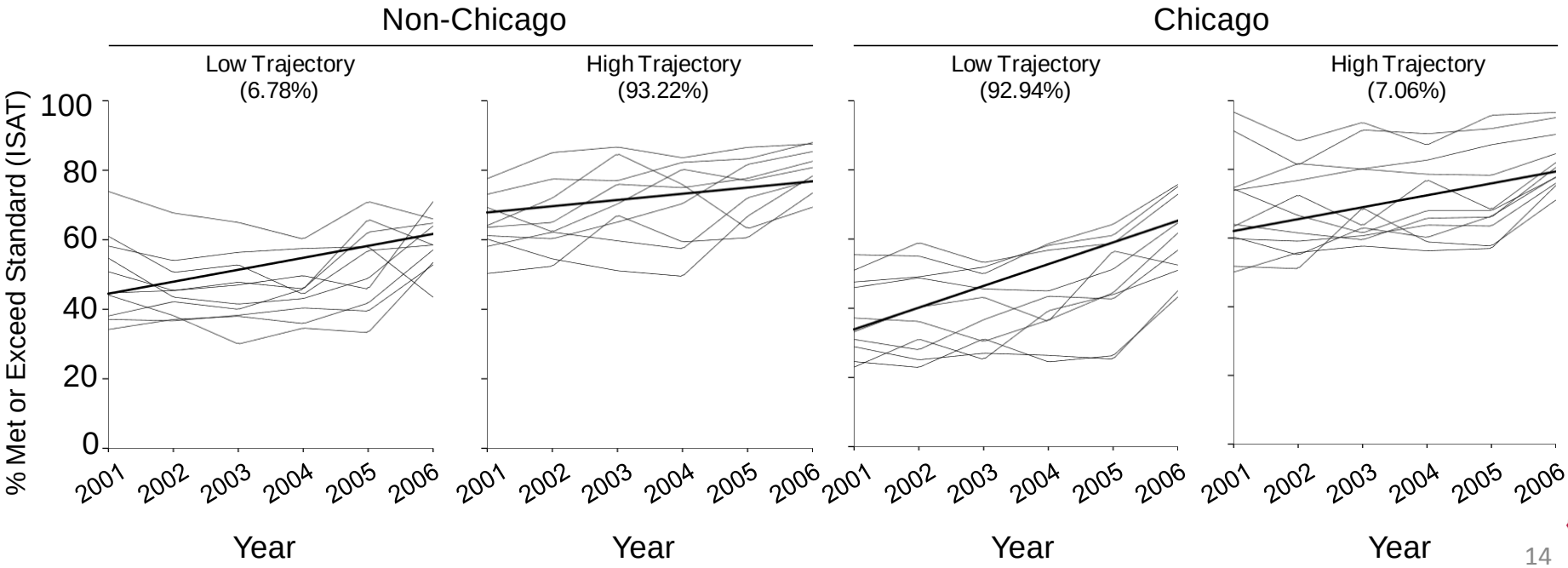
Summary

- **Principal preparation**
  - **Generally, no systematic impact on growth in proficiency or teacher qualifications**
    - **Except: graduate training at research-level institution appears to have a positive impact on teacher qualifications (in non-CPS elementary and middle schools)**

- **Principal professional experience**
  - **Generally, no impact on teacher qualifications**
  - **But, does appear to influence growth in student proficiency in some cases:**
    - **The most (6+ years) and least (1st year) experienced principals are associated with lower proficiency gains than principals with 2 to 5 years of principal experience (in non-CPS elem/mid schools)**
    - **Principals with prior experience as an AP at their current school tend to have a positive impact on student proficiency (at the elem/mid school level)**

Next Steps…

- Different measures of student achievement
  - Scale scores (if possible)
  - By grade and subject, rather than school composite
- Test non-linear trajectory patterns and non-linear effects such as principal tenure
- Examine multiple growth trajectories with growth mixture models:



Questions or comments?

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